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The Language of Teotihuacan Writing

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The Language of Teotihuacan Writing

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Abstract

The culture that thrived at Teotihuacan in the Classic period has a distinctive place in Mesoamerican history. Today, scholars study the imposing archeological site and its material remains to understand the culture that once flourished there. Whereas the decipherment of other Mesoamerican writing systems has provided a wealth of information about dynasties and historical events, scholars have not been able to access information about Teotihuacan society from their own written sources. Indeed, the topic of writing at Teotihuacan prompts several contentious questions. First, whether the graphic signs found in the imagery of Teotihuacan even constitute writing at all? Second, if it is writing, how did it work, and did it record one specific language, or was it meant to be read independently of language? And lastly, if it did represent a specific language, then what language was it? We propose that Teotihuacan writing shared basic principles of other Mesoamerican scribal traditions, including the use of logograms according to the rebus principle, and a principle we term ‘double spelling’. Arguing that it did encode a specific and identifiable language, namely a Uto-Aztecan language immediately ancestral to Nahuatl, Cora, and Huichol, we offer new readings of several Teotihuacan glyphs.

Teotihuacan

During its heyday in the Classic period (c. AD 0-650), Teotihuacan was unparalleled in its influence across Mesoamerica. The city was of gargantuan proportions and remained without equal until the large urban conglomerations of the Late Postclassic Aztec, a millennium later. At its peak, Teotihuacan was not only the capital of an important city-state, but was the heart of a multi-ethnic and pluralistic culture of the Central Mexican highlands, whose city-states spread into the basin of Mexico and adjoining regions (Figure 1). At its peak the urban population may have approximated 125,000 (Smith 2018) making it one of the largest conglomerations in the Western Hemisphere. Teotihuacan was not merely the capital of expansionist leaders and bellicose military orders, but an urban and cosmopolitan society with the Mesoamerican world as their horizon.

Archaeological and epigraphic evidence reveal that Teotihuacan's influence reached far and wide in Mesoamerica and beyond (e.g. Braswell 2008; García-Des Lauriers and Murakami 2021). As an urban culture and an imperial capital, it quickly became the home to a gamut of cultural groups, residing mostly on the outskirts of the metropolis, with limited integration into the heart of the city (Gómez Chávez and Abasolo Hernández 2011; Helmke 2012; Ortega Cabrera 2014; Rattray 1987, 1993). The foreign neighborhoods at Teotihuacan, show the presence of peoples from Oaxaca, West Mexico, Veracruz and the Maya area. The obviously cosmopolitan nature of the Teotihuacan polity, raises the question of ethnic and linguistic continuity in Central Mexico, both with the populations preceding Teotihuacan in the basin of Mexico, and with those remaining there after its fall. Where did the original founders come from, and where did they go? In addition to material culture and traditional funerary practices of their homelands, the founders of Teotihuacan also brought with them their languages, making Teotihuacan a multi-ethnic and diverse cosmopolitan city. However, what has puzzled researchers for decades is the language of the local Teotihuacan population, those who built the great pyramids, before the city had taken on its truly cosmopolitan appearance. The only way to identify such a language would be to find it encoded in written form at Teotihuacan, and this raises the question of writing at Teotihuacan. Some researchers have

viewed Teotihuacan as a utopian social experiment where even the most basic features of organized states, such as writing, are absent (e.g. Cowgill 1992:135-136; Pasztory 1992, 1997). Others have conceded that even if Teotihuacan culture was not literate per se, at least the capital must have relied on something resembling a notational system, to account for the many tasks that such an urban center would have required (Langley 1986, 2002; Valdez Bubnova 2012).

Teotihuacan Writing

One of the possible forays into the question of language is the writing system itself (Figure 2), but research into Teotihuacan writing has not drawn the attention of many specialists, owing to the small corpus of very brief texts. To provide context for the present proposal, we first review the most salient epigraphic progress and efforts at decipherment (a full review and the current status of the field is provided in the recent review by Helmke and Nielsen 2021).

The history of decipherment of Teotihuacan writing begins with the work of José María Arreola (1922), Herman Beyer (1922) and Alfonso Caso (1937, 1959, 1967), all of whom proceeded from the tacit assumption that the signs that could be isolated in Teotihuacan imagery were a form of writing. Although they did not themselves propose phonetic readings, they did draw comparisons to the writing system of the later Aztec, at times pointing out equivalences between signs and thereby suggesting corresponding meanings (especially for numerals and calendrical signs). Clara Millon (1973:311) explicitly compared the writing system of Teotihuacan with other Mesoamerican writing systems, stating that: “the writing system of the Teotihuacanos may not have been so completely different from other Middle American writing systems, as superficially it appears to be.”

In ensuing decades, James Langley (1986) set out to create a complete signary or sign catalogue, but in his later work there is a note of disillusionment, as he writes of glyphic signs as “notational elements”, sees the system described as a type of “symbolic notation” and sign clusters as “emblems” (Langley 1991,

1992). Surprisingly, Langley (1991:285) even went on to state that "No evidence of writing in the form of inscriptions or documentary records has been found at Teotihuacan". Similarly, in a recent synthesis of the archaeology of Teotihuacan, George Cowgill (2015:213-214) who has himself earlier proposed potential readings of Teotihuacan signs, now describes these as "standardized signs" that do not constitute "writing in the strict sense."

This ambiguity has proved a fertile ground for speculation. Even epigrapher Pierre Robert Colas identified some signs as probable logograms, but also went on to suggest that the writing system represents a combination of so-called "semasiographic" principles with true glottographic writing (Colas 2011; see also Nielsen 2014b). Even more recently, López Corral (2021) has proposed entirely non-linguistic readings that assign purely mathematical values to various iconographic elements, in attempting to "read" Teotihuacan images as complex calendrical and astronomical computations. These interpretations are all the more surprising, given that these diametrically oppose the proposals made by Thomas Barthel (1987) who suggested that the glyphs in speech scrolls recorded an early form of Nahuatl. Likewise, these stances are incompatible with the influential study by Karl Taube (2000) wherein he outlines all the features that define Teotihuacan writing as a typical Mesoamerican writing system.

To be sure, to the modern observer, the Maya writing system, with its orderly columns of highly stylized signs and a relatively clear separation between text and image, may appear much more akin to writing, in a European sense, than the seemingly haphazard juxtapositions of highly figurative elements found at Teotihuacan (although compare Salazar Lama and Valencia Rivera 2017 with Taube 2000; also Domenici in press). This aspect, and the difficulties of clearly tying Teotihuacan signs to language, has made some scholars reluctant to describe these signs as "writing", contributing to the notion of Teotihuacan as a society without writing (see Marcus 1992: 3, 17; Nichols 2016: 37-38). Following the decipherment of the Maya script, recent decades have also seen significant advances in our understanding of Aztec writing (e.g., Davletshin 2021; Lacadena 2008; Valencia Rivera 2021; Velásquez García 2019; Whittaker 2009,

2021; Zender 2008a), which much like Teotihuacan writing was formerly considered to be something other than "true writing". Now that these writing systems have been deciphered, no scholars would argue that these are not a form of glottographic or logophonetic writing (Lacadena 2019; Whittaker 2021).

A way forward

As scholars gradually accept that Teotihuacan must have had some form of writing, we see a growing realization that it is more comparable to other contemporaneous Mesoamerican societies, and later cultures in Central Mexico. In our opinion, the most promising advances towards a decipherment have been those that seek to identify the function of signs in the writing system, to account for their contexts and the parts of speech that these likely record. Precisely this type of semantic decipherment has proved particularly promising and has been advocated by epigraphers for the past two decades. It has enabled the identification of calendrical signs, place names, titles, as well as isolating probable names, both anthroponyms of historical figures and theonyms, and has even led to the identification of likely verbal expressions (e.g. Domenici 2017, in press; Helmke and Nielsen 2014a, 2021; Millon 1988; Nielsen and Helmke 2014, 2020; Taube 2000, 2011). A further step in the actual phonetic decipherment is to match up signs to words and meanings in potential candidate languages, assessing the probability and plausibility of such matches. This, however, presents the problem of deciding which language candidates are most likely encoded in Teotihuacan signs.

Given that Teotihuacan undoubtedly had a linguistically diverse population, in principle, Teotihuacan writing may represent any or all of them. Nonetheless, the presence of Zapotec and Maya writing at Teotihuacan suggests that foreign languages were recorded in their own scripts. That being said, logograms as word-signs are a type of sign that can be said to primarily bear and convey semantic information and thereby can be understood independently of a specific language. It is precisely this feature of logograms that has allowed semantic decipherments and epigraphic forays into the writing of

Teotihuacan. Logograms, however, leave us in an ambiguous situation with regards to language, as in theory, a purely logographic writing system could be understood by all of the inhabitants of Teotihuacan, regardless of their linguistic background (Houston 2004:277-278). If this were the case, it would be impossible to decipher the writing system and to identify the language(s) spoken by the writers. Nevertheless, it is a reasonable assumption that the city had a dominant language, and that the writing system was developed for this language. From an epigraphic standpoint, this is a sound precept because all known writing systems that make use of logograms, use these to cue specific words and readings, and also use logograms for sound values in a specific language (e.g., Daniels and Bright 1996). Also, whereas writing systems can be adapted to fit different linguistic contexts, all known writing systems are developed within a specific linguistic matrix, where the words for culturally-significant things are coded to their graphic representations. In a Mesoamerican context we can also see a close equivalence between writing systems and archaeological cultures, with little overlap between these, suggesting that writing systems were each tied to a particular language (or at least language family), in which a given writing system was developed (Helmke and Davletshin 2019; Houston 2004:293-308; Justeson and Mathews 1991).

At Teotihuacan, epigraphic work over the past two decades has found that a majority of signs employed in the writing systems are logographic. This is based in part on the results of semantic decipherments (matching a sign with its probable meaning, but not to a specific linguistic form) but also because sign combinations involve exceedingly few signs, in most cases combining only two signs (see Helmke and Nielsen 2021:43-45; Taube 2000). This constitutes a significant obstacle to a phonetic decipherment of Teotihuacan writing, as, without evident phonetic signs, the logograms allow solely for semantic decipherments that match a sign with its probable meaning, but not to a specific linguistic form.

Yet, the one context in which logograms can function phonetically is when these are used according to the rebus principle, where the phonetic value of a logogram is used, to cue a word with a different meaning, but a similar phonetic value. This is a typical scribal recourse wherein homonyms (or near homonyms) of

the language allow for this kind of substitution, and frequently employ signs that have clear visual referents, to prompt a reading of another word that is more difficult to render graphically (see Lacadena García-Gallo in press; Velásquez García 2019:75-78; Whittaker 2021:78-79). All known logographic writing systems are thereby also logophonetic, as they employ the rebus principle to varying degrees. If Teotihuacanos also used rebus in their writing, we may be able to tie specific logograms to their phonetic values in a specific candidate language, and repeated pairing may enable the identification of the language recorded, allowing us to deduce the meaning of the text.

Previous proposals

With a predominance of logograms and without a clear language candidate, the prospects of deciphering Teotihuacan writing may seem bleak. Yet, despite these obstacles, scholars have proposed different candidates for the language encoded in Teotihuacan writing, including Nahuatl, Otomí, Totonac and an extinct and undocumented language of the Mixe-Zoquean family (see Nielsen and Helmke 2011:345-349). Because Teotihuacan is located in an area where Nahuatl is spoken, historically and currently, and because Nahuatl is known to have been a prominent language in Mesoamerica, several Nahuatl-based readings have been proposed for logograms at Teotihuacan. This also follows on the identification of sign continuities between the writing of Teotihuacan and that of the later Aztec (Beyer 1922; Helmke and Nielsen 2014a, in press; Nielsen and Helmke 2011, 2014; Taube 2011). Several proposals have offered readings of logograms using phonetic values from 16th century Nahuatl (Cowgill 1992; Taube 2000; Whittaker 2012, 2021) or from a reconstructed earlier form of Nahuatl (King and Gómez 2004). These are promising proposals in that they posit phonetic readings of logograms but we should remember that adscriptions of hypothetical values to logograms do not constitute decipherments. However, the most serious problem is that they attempt to read the glyphs in a form of Nahuatl that postdates the heyday of Teotihuacan by at least a millennium. The proposal by King and Gómez makes the reasonable attempt to try to read them in an earlier form of Nahuatl, but the proposal is weakened by the fact that it seemingly

relies on *ad hoc* reconstructions—and that the reconstructed stage of the language is in all likelihood not early enough (as is described below). Moreover, none of the proposals have been conducted in a systematic way with a temporally appropriate form of Nahuan, before being tested for its overall fit on the corpus of Teotihuacan glyphs.

Nahuan Languages and Southern Uto-Aztecan

Nahuatl, is the most frequently mentioned candidate language for ancient Teotihuacan. It belongs to the widely dispersed Uto-Aztecan language family (UA), with languages scattered throughout Northern Mexico and the American Southwest (Caballero 2011) (Figure 3). The name Nahuatl comprises a group of closely related linguistic varieties spoken as far north as Durango, Mexico and as far south as El Salvador. Today the internal diversity of the group is such that it warrants speaking of a group of Nahuan (or Aztecan) languages, rather than a single Nahuatl language. These languages must descend from a single proto-Nahua language (PN), which can be reconstructed using the historical comparative method. PN has been reconstructed by Karen Dakin (1982), but subsequent advances in our understanding of the historical development of Nahuan languages allow for more fine-tuned and refined reconstructions. Comparative work has now established that Nahuan languages are grouped into two main branches, an Eastern and a Western branch (Canger and Dakin 1985; Dakin 2021). Eastern Nahua extends from the Huasteca region and along the gulf coast and southward into El Salvador. Western Nahua centers around the Basin of Mexico and adjoining states, reaching northwest all the way to Durango. Langacker & Campbell (1978) considered the extinct Pochutec language of Oaxaca a separate third branch, possibly a sister language to PN, but Dakin (1983) demonstrated that it can be derived from within the Western branch of PN. This means that the idea of King and Gómez (2004) that “Nahua-Pochuteco” is older than proto-Nahua itself is erroneous, and that their reconstructions represent a language more likely spoken in the early Postclassic, but not that spoken a millennium earlier during the Classic period. However, an

even earlier stage of Nahuan can be reconstructed by comparing PN with the languages to which it is most closely related.

The Uto-Aztecan (UA) language family itself is widely considered to have two main groups: Northern Uto-Aztecan (NUA) and Southern Uto-Aztecan (SUA) (though some scholars disagree whether only one or both groups are phylogenetically valid; see Hill 2011; Haugen et al. 2020; Shaul 2014). Nahuan is part of the southern group of languages, but its potential relations to other SUA languages have also been a matter of debate. Campbell and Langacker (1978) argued that Nahuan (which they called Aztecan) forms a group with the two Coracholan languages Cora (or Náayeri) and Huichol (or Wixárika), and that several shared phonological innovations between Coracholan and Nahuan suggest that they descend from a single intermediate ancestor language—which would have been the southernmost variety within an early SUA dialect continuum. Given that Corachol and Nahuan are the southernmost UA languages, this is a reasonable starting hypothesis. Other scholars, however, have argued that Corachol and Nahuan descend through separate branches, and that the similarities demonstrated by Campbell and Langacker are due to early contact between speakers of proto-Corachol and PN (Kaufman and Justeson 2007:195, 2009:225; Dakin 2017). Systematic comparative work on Corachol and PN by Pharao Hansen (2020) further supports Corachol-Nahua as a valid phylogenetic grouping, which is also supported by recent lexicostatistical analysis by Greenhill et al. (2022). The present proposal uses a database of some 300 lexical items reconstructed for proto-Corachol-Nahua and Southern Uto-Aztecan by Pharao Hansen. The full database is not included here, but the parts that are directly relevant for the present proposal are included as Supplementary Material. It is important to note that the reconstructions have been prepared independently of the proposed readings presented here.

Another important question however, is where and when PN and its ancestor PCN were spoken. Following debates over the past two decades, scholars of Uto-Aztecan nowadays place the UA homeland in the American Southwest or southern California (Greenhill et al. 2022; Shaul 2014; Hill 2019), though it may also have extended into northwest Mexico. Nahua ethnohistorical sources from the colonial period

also describe the Nahuatl speaking peoples as having arrived in Central Mexico from the North (Smith 1984). Kaufman and Justeson (2009) have argued that PN was spoken in contact with speakers of Totonac, Mixe-Zoque and Huastec and argue that the most likely location for the PN homeland is to northeast of the basin of Mexico. Others have found it more likely that Nahua speakers arrived in Central Mexico from the northwest (Beekman and Christensen 2003), and that they were in contact primarily with speakers of Cora and Huichol (Dakin 2017). Additionally, there are historical reasons to believe that Cora, Huichol and Nahuan and other closely related Uto-Aztecan languages were spoken in a much larger area of Western and Central Mexico at the time of earliest European colonization (Miller 1983). If Nahuan and Corachol are indeed offspring of a single ancestral SUA variety, then this variety may have formed a dialect continuum from the Pacific Coast of Nayarit in the west and eastward into the Central Mexican Plateau, perhaps even reaching the valley of Mexico. When that dialect continuum eventually disintegrated, the southeastern-most dialect became the earliest form of proto-Nahua while the western PCN dialect became the proto-Corachol language (Pharao Hansen 2020).

There is also no consensus about the question of *when* early Nahua speakers arrived in Central Mexico, and hence whether they could have been present at Teotihuacan. Some linguists have proposed that Uto-Aztecan linguistic influence may have spread from Teotihuacan to other areas of Mesoamerica (Dakin and Wichmann 2001; Macri and Looper 2003; Wichmann 1998), while others have rejected this idea, seeing Nahua speakers as newcomers in the Postclassic period (Kaufman and Justeson 2007, 2009).

It is significant, that the form of PN that can be established by internal reconstruction of Nahuan varieties *already* bears all the signs of having become fully assimilated to the Mesomerican linguistic area (Campbell et al. 1986). This implies that PN had co-existed with Mesoamerican languages for a considerable period of time for its grammatical profile to have become fully assimilated to its Mesoamerican neighbors, which the late-comer hypothesis hardly allows. The Corachol languages, located on the northern edge of Mesoamerica, in turn, exhibit only a lesser degree of assimilation to the Mesoamerican linguistic area. These are much more conservative than Nahuan, and therefore more

similar to the other SUA languages of Northern Mexico. Comparison of Corachol and PN therefore permits us to reconstruct an early stage of PN, which represents the stage of the language before it was influenced by Mesoamerican languages. If the split of PN into the Eastern and Western branches can be dated to the juncture between the Epiclassic and Early Postclassic migrations (c. AD 600-1100) as suggested by (Dakin 2021:2180), then the assimilation of Nahua to the Mesoamerican language area must have taken place during the Classic period. Therefore, if an early form of Nahua was present at Teotihuacan then the best candidate would be early proto-Nahua or even earlier proto-Corachol-Nahua (PCN) (see the chronological model for the development of Corachol-Nahua in the Supplementary Materials). The basic hypothesis that a Uto-Aztecan language ancestral to Nahuan was spoken at Teotihuacan, has been proposed, or even assumed, in previous proposals. This article seeks to test this hypothesis, by using a list of reconstructed vocabulary in the earliest direct ancestor of Nahuan to read the glyphs at Teotihuacan, focusing on finding possible phonetic readings that are motivated by the rebus principle or by use of phonetic complementation.

The motivation for testing PCN as a candidate occurred by a happenstance, when Helmke, who was working on Teotihuacan writing, showed a glyphic sign compound from Tetitla to Pharao Hansen who was working on the reconstruction of PCN. The sign in question renders a face with nopal cactus pads affixed to the ears. At this, Pharao Hansen, immediately remarked that the word for ‘ear’ and for ‘nopal’ are near homonyms in Corachol. The use of homonymy to prompt a phonetic reading of a logogram, is of course the rebus principle that ties logograms to readings in a specific language. This observation of homonymy opened the way for us to explore the reconstructed proto-Corachol-Nahua language as a candidate language for that encoded in Teotihuacan writing. In the following, we present a series of proposals of phonetic readings of Teotihuacan signs, which support the premise that one of the languages encoded in Teotihuacan writing is a Southern Uto-Aztecan language similar to the PCN reconstructed by Pharao Hansen.

Ears of nopal

The rich array of polychromatic murals of the Tetitla compound at Teotihuacan are punctuated by large emblematic glyphs (de la Fuente 1995:259-311; Miller 1973: 119-156). The murals span over the walls of several buildings and form an imposing thematic tableau. The murals that decorate the buildings facing onto Patio 1, cover the walls of rooms, and spill out onto porticos, forming a single great narrative that spans from north to south (Miller 1973:120-124). In these, we can see a procession of priestly figures, performing scattering rituals. Only the lower halves of these figures are preserved, but large emblematic glyphs are displayed in front of these individuals (Figure 4). One such glyphic compound represents what is called an 'enclosure sign' in front of which a pair of disembodied hands in the act of scattering, and thereby provides a verbal reference to the ritual actions that these priests are conducting (Helmke and Nielsen 2021:45-46) (Figure 4a). On another partly preserved mural, we can just discern a glyph for 'mountain' that is modified by a speech scroll qualified by a flower, which based on comparisons to Aztec writing and Nahuatl has been interpreted as a toponym for 'singing mountain', quite possibly commemorating an important pilgrimage to this locality (Helmke and Nielsen 2014a: 91, 93-94) (Figure 4d). Among the remaining glyphs is what appears to be a shield that is crossed by the so-called 'four element group', a set of linear elements that are symbolically related to fire (Langley 1991:291-292, Fig. 15; von Winning 1987:II:15-23) (Figure 4b). At Tetitla, this combination is likely to represent an anthroponym naming one of the individuals depicted, as 'fire shield' (Helmke and Nielsen 2021:53, Fig. 13b). The last well-preserved emblematic glyph represents a human face, which frequently has been interpreted as that of a woman, whose ears are adorned by flowering pads of the nopal cactus (*Opuntia* spp.) (Figure 4c). This stunning combination quite probably records another name, and it is here that an interesting conjunction becomes apparent, as the words for 'ear' and 'nopal' are near-homonyms in the Cora and Huichol languages and is also reconstructed as such for PCN.

PCN	Gloss	lang.	attested forms
**nakása*	'ear'	Hch.	*naaká*
		Cr.	*nasaíh*
		Nah.	*nakas-*
**nakári*	'nopal'	Hch.	*nakári*
		Cr.	*naká*
		Nah.	*naka-* 'meat'

One of the scribal recourses found in Aztec writing is what has been called 'redundant logographic homophones' (Lacadena García-Gallo in press; Velásquez García 2019:75-78), which we here refer to as "double spelling". In this type of spelling the reading of a logogram is reinforced by writing an additional logogram of similar pronunciation. In these cases, one of the logograms encodes the desired semantic value as well as the corresponding word in the language, whereas the other is represented merely to ensure the proper reading. Such spellings form a particular class of phonetic complementation. Many examples of this writing convention are known from Aztec codices, particularly those of the so-called Tenochtitlan-Tlatelolco school, where emphasis is given to the use of logograms (Lacadena 2008:12-13).

An illustrative example of double spelling in Aztec writing concerns the settlement named <*Quaguacan*> mentioned in the Codex Mendoza (Berdan and Anawalt 1992:200), where the place name *K*^{w}*awa'kan* is written in glyphs with a full-figure eagle, standing in front of a tree, which together provides the sign compound **K^{W}AW-K^{W}AW** (see Peñafiel 1897:71 for his comparable reading as Cuahuacan-Cuauhtla) (Figure 5a). Examining the glyphic spelling, the meaning may be unclear, but the reading of the root is reinforced by the double spelling, leaving the reader to reconstruct the toponymic *-tla:n* suffix (Berdan and Anawalt 1992:200; Peñafiel 1897:71). Another particularly illustrative example (Berdan and Anawalt 1992:181) represents the place name <*Coyuacan*>, now a district of Mexico City. In this case,

the primary logogram represents a full-figure coyote, for **KOYO**, that is infixed by a small circular perforation that is likewise is a logogram for **KOYO** from *koyotik* 'hole, perforation' (Berdan and Anawalt 1992:181). This pairing is thereby another instance of double spelling, here for the toponym *koyo[wa'kan]* (see Domenici 2017:54; Helmke and Nielsen 2014:44) (Figure 5b). A comparable toponym may also be represented at Teotihuacan, in the murals of the White Patio at Atetelco, where a row of coyotes are represented, each with a circular sign embedded into their chests (de la Fuente 1995:203-205, Lám. 6; Domenici 2017:54, Fig. 3.1a). The graphic correspondences are so close to the later Aztec examples that we cannot help by wonder whether these are not comparable spellings, where the embedded sign (see Taube 1992a) serves as a double spelling of the word for 'coyote'.

Returning to Tetitla, the juxtaposition of the nopal pad (**nakári*) and the ears (**nakása*), strongly suggests that the scribe was intending to prompt a phonetic reading as *nakasa+nakari*, focusing on the shared initial syllables *naka*. This enables the reading of the nopal ear as a double logogram with the logographic value **NAKA**. By simultaneously using both of the logograms that can produce the phonetic value **NAKA**, the scribe provided a double spelling as **NAKA-NAKA**. We suggest that the nopal-ear double spelling is meant to represent the name of the person depicted, or at least the first part of it, leaving the reader to supply the final segment. Coincidentally, the name of the great founding fertility goddess of the Huichol is none other than *Nakawé* (Pharao Hansen 2021), demonstrating its onomastic value. At Teotihuacan, we may entertain the possibility that this represents the theophoric name of an actual person captioned by these glyphs, rather than rendering a theonym.

The shallow basin

Among the signs of Teotihuacan writing is one that represents a 'shallow basin' (Taube 2000:9, 20, 23; see also Langley 1986:299, n. 266). The same sign continued to be used in the ensuing writing system of the Epiclassic and is found at sites such as Cacaxtla and Xochicalco (Berlo 1989:32; Helmke and Nielsen

2011:20-22). The sign appears to represent a stylized dish or shallow bowl. In the context of writing, the sign is used as a type of container into which other signs are placed, wherein the shallow basin is generally the lower sign in a compound. Combinations can be simple, as for instance on a polychromatic tripod vessel, wherein a series of atlatl dart butts are placed within the dish (von Winning 1987: II: Chapt. 8, Fig. 3d), or in other examples at Acanceh where the sign for 'cattail reed' is nestled within the bowl (Stuart 2000:502-504) (Figure 6b-d). In these cases, the shallow basin appears to serve as a type of locative marker, but in other instances, we can see that calendrical notations are also placed within the shallow basin. Thus in the so-called Ixtapaluca plaque (originally from the vicinity of Chalco) we see the date '7 Reed' set within a shallow basin (Helmke and Nielsen 2011:21) (Figure 6a). The same type of usage is also documented in later Epiclassic writing where the shallow basin sign is equally used in both toponymic as well as calendrical notations (Helmke and Nielsen 2011:20-22).

Given these contexts, it is unlikely that the sign is meant to be understood in a literal fashion, but is more likely to function as a rebus for a homophonous suffix that is used in both locative and temporal constructions (Helmke and Nielsen 2011:20).

In Nahuatl, a basic word for a ceramic vessel is *komitl*, where the *-mi* part may be a collective suffix that describes things that occur in groups (Laughlin 2014). The first author reconstructs the root **ko* for PCN with the meaning 'hollow', from which words were derived designating containers of this form (*komitl* 'jar, olla', *komalli* 'griddle') as well as features of the landscape, such as hollows and basin-shaped depressions (*komo:lli* 'depression/hollow', also *koyo:ni* 'make a hole'). At the same time *-ko* is a locative and temporal postpositional suffix in Nahuatl with cognates in other Uto-Aztecan languages. We therefore hypothesize that the shallow basin sign may function as the logogram **KO**. This reading is further supported by the fact that in later Aztec writing a similar sign depicting a small stylized *olla*, or ceramic jar, functions as the phonogram *ko* (Aubin 1849:35; Lacadena 2008:9-10). In Aztec writing, this logogram is frequently used to write the locative suffix *-ko*, which is used to form toponyms, but also for general locative expressions, which also describe temporal relations (Karttunen 1992:36). This suggests a

clear linguistic and scribal continuity from Teotihuacan to Aztec times in using the depiction of a ceramic vessel to write the syllable **KO** in the function of the locative suffix.

Roots and places

A sign that has relatively high incidence at Teotihuacan is the so-called 'twisted root' sign (Langley 1992:Fig. 6a; Taube 2000:9; Nielsen and Helmke 2008:461). In the depiction of plants, Teotihuacan conventions follow those of related central Mexican cultures in representing not just the part of the plant that appears above the earth, but the whole plant, including the roots (see Berrin 1988; Sahagún 1950-1982:XI:Figs. 479-615). This is most clear in the murals of Techinantitla, where large writhing feathered serpents soar in the skies above flowering orchards, as these disgorge streams of life-giving water. The trees and bushes are represented with broad stems and ample roots. Distinguishing the trees are the stylized flowers on each branch, as well as the glyphic sign combinations that mark the stems. Many of the associated glyphs are repeated in regular sequences, suggesting that these could name particular plants. Cowgill (1992:237-239) was the first to suggest identifications for two of these plants, which provide rather convincing correlations to known Aztec names for plants, including the *tlapalomixochitl* (i.e. 'red bone flower', also known as the *Omixochitl*, *Polianthes tuberosa*) and the *tlapaluacalxochitl* ('red basket flower', possibly the same as the *Uacalxochitl*, *Phyllodendrum affine*) (see Sahagún 1950-1982:XI:198, 209) (Figure 7a-b). It is compelling to consider that these represent Nahuatl words that include the exact elements represented—but as Cowgill himself acknowledged, there is in fact no indication that the logograms are being used phonetically. Following a suggestion by Lyle Campbell, Cowgill (1992:242) notes that in Totonac there is also a plant called 'bone-flower', suggesting that the logogram could be read also in other languages. Thus whereas the signs may help us identify the plants represented, these do not identify the language in which it these glyphs were meant to be read.

However, when segregated from plants, the same twisted root sign is used as part of sign combinations that appear to be toponymic in function (Taube 2000:9). For instance, the twisted root sign demarcates the lowest portion of the basal register of a large supernatural scene (Miller 1973:Figs. 114-115; de la Fuente 1995:71, Fig. 6.7) in a context where we can expect toponymic references, or notations pertaining to place. The twisted root sign is also found several times in the carved panels of the site of Las Parotas where these serve to designate a named mountain place (Valdez Bubnova and Rivera Guzmán 2017). The same sign is used not only in Teotihuacan writing, but continues to be used in the writing system of the ensuing Epiclassic (Helmke and Nielsen in press).

Taube (2000) suggests that the twisted root sign is a locative marker and ventures a reading based on a clue from colonial Nahuatl. He suggests the sign could be read as the Nahuatl word for 'root' *tlanelwatl*, which he further suggests could represent the locative suffix *-tla:n*. This reading however is faulty as it is based on an erroneous segmentation of the Nahuatl word. The word does mean 'root' in Nahuatl, but the lexical root of the word is not **tlan*, but *nelwa*. Being the name of a part of a plant, the word *nelwa* is inherently possessed in Nahuatl, and when it needs to be represented in an unpossessed form it takes the dummy possessor prefix *tla-*. However, we do believe that Taube was correct in identifying the sign as a locative sign with the meaning 'root', and it does have a potential locative reading in PCN.

Nahuatl shares with Corachol a lexeme that can be reconstructed as **neriwa* 'edible root' (which gives Nahua *nelwa*, and Huichol *ínieri* and Cora *ínee*), but there is evidence to suggest that PCN also had another general word for 'root' which can be reconstructed as **nawa*. In Huichol, the general word for 'root' is *naná*, in Yaqui it is *naáwa* and in Warihio *nawá*. Pharao Hansen proposes that the PCN lexeme **nawa* 'root' is cognate to the Nahuatl locative suffix *-naawa-k* meaning 'near, adjacent to'. The final *-k* in *-naawak* is the same locative suffix *-ko* mentioned in the preceding section which is regularly reduced to *-k* in late proto-Nahuatl when appearing after a syllable ending in a vowel. The full postpositional expression would then originally have been *-naawa-ko* and have had the meaning 'at the root of X'. This way of forming locatives by conceptualizing a spatial relation through a metaphor of inherently possessed

parts is typically Mesoamerican (Bohnemeyer et al. 2015). In this way, a root may metaphorically denominate a place where something is anchored or originates. In Nahuatl, these body-part metaphors generally combine a part of the body with one of the postpositional locative suffixes.

Indeed several examples of the twisted root glyph, co-occurs with the shallow basin glyph (e.g., at Atetelco, Tetitla, Zona 5A, Techinantitla) (Figure 6e). In the murals of Atetelco, the twisted root is used as a type of suffix, below the shallow basin sign, here containing an owl within a mountain range, topped by large obsidian blades. The glyphic combination within the peak, here named with an owl, followed by a shallow basin and the twisted root, likely names a particular peak within that mountain range (Nielsen and Helmke 2008; Helmke and Nielsen 2014a:101, Fig. 13g-h). Reading the glyphs with the values **TEKO-NAWA-KO** proposed above, this toponym can be understood as 'at the root of the owl/lord' (adding **teko* 'owl', see Pharao Hansen ms).

Another related example is rendered on a polychromatically decorated stucco tripod where the head of what may be a bat is suffixed by a series of three twisted roots (Berrin 1988:209; Conides 2018; Taube 2000:Fig. 17c) (Figure 7d). Drawing on the reconstruction of the term 'bat' as **tsi-naka* in PCN, this compound may have had the intended reading of *tsinaka-nawa[ko]*, for 'at the bat place'.

The stone series

Building on findings made by Marc Zender (2008b), Helmke and Nielsen (2014a:81-83) have demonstrated the underlying coherence of sign formation processes in a set of Mesoamerican logograms. In particular, this concerns what can be called the 'stone sequence', where in ancient Aztec writing the small lateral scrolls that are the diagnostic elements of the logogram for 'stone' are repeated in the logograms for 'mountain' and 'cave' (Figure 8a). This underlying graphic logic suggests a significant degree of coherence and continuity of Mesoamerican writing systems, even though these were each developed in their own linguistic context, drawing on the representational conventions in use in that

particular culture. That this system extends to Teotihuacan has already been demonstrated (Helmke and Nielsen 2014a:81-83), showing that the diagnostic element of 'stone' are the triangular serrations that are found within signs such as those representing obsidian blades. The same serrations are equally present on the interior of the logogram for 'mountain' as well as for 'cave' (Figure 8b), following the same structures as those seen in Aztec writing. A graphic variant is evident in later glyphs of Teotihuacan, where the sharp pointed serrations have been reduced to duller lunate crenellations (Figure 8c).

The graphic elaboration of these logograms, repeating graphic features of the sign for 'stone', may suggest that we are looking at a series of semantic determinatives, that qualify as to material and assist in identifying particular logograms. However, the reconstructions of PCN reveal that the words referring to the three elements in the stone series ('stone', 'mountain', 'cave') in fact shared the initial syllable **te* in all the three of the proto-forms (**te* 'stone', **tepe* 'mountain' and **teso* 'cave'). This suggests that the scribal additions may not have been merely semantic, but also served as phonetic complements, cueing readings for speakers of PCN.

proto-form	**Gloss**	**lang.**	**attested forms**
**te*	'stone'	Nah.	*te-*
		Hch.	*teté* 'piedra'
		Cr.	*teté* 'piedra'
**tesaka*	'obsidian, flint'	Cr.	*tehka* 'obsidiana'
		Hch.	*téka* 'piedra vidriosa'
		Nah.	*teska-* 'obsidian mirror'
**tékà-pari*	'flint, knife'	Nah.	*tekpatl* 'flint'
**tepe*	'earth/mountain'	Nah.	*tepe:tl* 'mountain'
		Tbr.	*tepe* 'alto, cerro' (Lionnet 1978:66)
		Op.	*tepe téve* 'earth' (Stubbs 2011#757)
**teso*	'cave'	Nah.	*osto*
		Cr.	*tastaa* < from **teso-taa*

		Yq.	*teéso*
		War.	*tesó*
		Hop.	*tɨɨso <tùusö>*
**tesoni*	‘tezontle’	Nah	*teson-*
		Hch.	*texuni*

These reconstructions show that in southern Uto-Aztecan languages, the words of the “stone series” all begin by *te-* (which reflects the proto-Uto-Aztecan root *tɨ-* ‘stone’). However, it also shows that the use of the serrated edge sign that is common to the stone series, could be phonetically motivated *only* in a Southern Uto-Aztecan language, but, crucially, *not* in proto-Nahuatl, where the original form *tesó* had been transformed first by syncope (**tesó* to **itso*), then by metathesis (**itso* to **isto*) and finally by vowel assimilation, to *osto-* (see Supplementary Material). Nevertheless, with the antecedents of Teotihuacan writing, the stone sign, would continue to be used, albeit, as a semantic determinative in the later writing systems from the Epiclassic onwards (see Helmke and Nielsen 2014b:25). In this way, the stone series provides a strong argument for maintaining that the language at Teotihuacan, was such an early form of Nahuan that it more closely resembled its Southern Uto-Aztecan predecessor.

Correspondences

Having now proposed readings of Teotihuacan logograms using the reconstructed PCN lexicon, we now turn to consider two lexical items that appear in Classic Maya writing in cultural contexts related to Teotihuacan. These terms have long been identified as highly promising lexical items of Teotihuacan language as these cannot be etymologized in Mayan languages and may function as loanwords that refer to objects that are likewise foreign to Maya material culture (Nielsen and Helmke 2011:346-348).

The first is a glyphic compound recorded on the side of the famed Stela 31 of Tikal, which portrays the local ruler, Sihyaj Chan K’awiil II in AD 445, flanked on either side by what may be emissaries from

Central Mexico (Beliaev 2019; Stuart 2000:Fig. 15.2, 469, 481-482) (Figure 9a). The segment in question is couched in the caption above one of the emissaries and includes three phonograms above what appears to a woven mat throne, known as an *ikpalli* in Nahuatl that is a typical symbol of central Mexican rulership (Sahagún 1950-1982:VI:68; Davletshin in press). The phonetic sequence above the throne can be transliterated as **ko-sa-ka** (as first identified by David Stuart), which bears a significant resemblance to the Nahuatl *kooskatl* 'necklace, collar' (Karttunen 1992:43) (Figure 9b). This term has previously been analyzed as either an early Nahuatl term (see Boot 2010:154-155) or an early proto-Nahuatl form (Nielsen and Helmke 2011:347). Now, based on the reconstructions for PCN we can propose the following: that word for 'necklace' can be reconstructed as **koosaka*, which then after a syncope of the unstressed vowel becomes **ko:ska* in proto-Nahuatl and Corachol, becoming *kúka* in Huichol as the *s* is elided before *k* to avoid a consonant cluster.

proto-form	**gloss**	**lang.**	**attested forms**
**koosa-ka*	'shell, bead, necklace'	Nah.	*koska-*
		Hch.	*kúka* 'chaquira, cuello de chaquira'
		Yq.	*koóka* 'necklace'

This reconstruction fits the attested lexeme on Tikal Stela 31 perfectly, and shows that this is a term of considerable antiquity, possibly serving as part of a poetic pairing for royal authority when juxtaposed to the woven mat throne (Helmke in press). It is significant that the etymology of **koosa-ka*, builds on the root **koosa* that can be reconstructed to mean both 'yellow' and also appears in reflexes for 'rainbow'. The original reference to the iridescent appearance of mother-of-pearl, seems to be the origin for both 'yellow' *koostik* and 'rainbow' *koosamalotl*, in Nahuatl.

proto-form	**gloss**	**lang.**	**attested forms**
**koosa*	'yellow, rainbow'	Nah.	*koos-tik* 'yellow'
			koosa-maloo-'rainbow'
		Cr.	*ku'usa'a* 'rainbow'

This same conceptual overlap is found in the imagery of Teotihuacan, not the least since the very emissaries represented on the side of Stela 31 wear precisely necklaces of seashells. Furthermore, in the murals of Portico 11 at Tetitla, that are typically described as representing 'the Great Goddess' (see Berlo 1992; Paulinyi 2006), but are now thought to represent a glyphic compound dominated by a masked and elaborately attired mortuary bundle (Ruiz Gallut 1999:174-184), the figures wears a series of necklaces, qualified by five square glyphic signs (Figure 9d). The constituent signs are referred to as a 'quincross' sign in Teotihuacan literature (Langley 1986:23, 2002:301). These are identical to the logogram for 'yellow' as used in other Mesoamerican writing systems (Worm Danbo 2019:141-144), and at Teotihuacan function to qualify one of the aspects of the Teotihuacan Storm God that is tied to the cardinal direction associated with that color (Langley 1992:249-253; Wrem Andersen and Helmke 2013:177-189, Fig. 10f). In this context, the logogram can be attributed the value of **KOSA**, and read as *koosa* 'yellow, nacreous' or *koosa[ka]* 'necklace'—in the first case qualifying the necklace by its material or color, and in the other serving as a phonetic cue for 'necklace'. The Nahua word for necklace *kooskatl* seems derived from the adjectival root *koosa* with the nominal derivational suffix *-ka* (see Dakin 2004). A cohesive picture thereby emerges from the close integration between the glyphic evidence and the imagery and their overlap with these various lexical entries.

The other lexical item connected to Teotihuacan culture is the word for a shell-platelet helmet, the typical protective gear of warriors from the Central Mexican metropolis. Good examples of figures wearing these helmets are found on the sides of Tikal Stela 31 and also on a plano-impressed bowl found at Las Colinas,

near Calpulalpan in Tlaxcala, which represents three high-standing warriors in a file behind another figure with a Tasseled Headdress, each labelled with their own glyphic caption (see Linné 1942:Fig. 128; Millon 1988; Taube 2000:10-12, Fig. 8). A plano-relief sherd, originally in the collection of Hasso von Winning, shows one such helmet as part of an accession ceremony, where the headgear and a seashell necklace are handed over the person that is acceding to the corresponding office (von Winning 1981; Nielsen and Helmke 2020:326, Fig. 8d). In Classic Maya inscriptions, references are made to these helmets, often as a complete logogram, sometimes suffixed by a phonetic complement **-wa** (Figure 9c) and at other times these are specifically named as **ko-o-ha-wa**, for *ko'haw*. This has been interpreted in a variety of ways, either as a term related to the proto-Nahuatl **k^{w}a:-h* (Macri and Looper 2003:290-291), remarking also that certain colonial entries for headgear build on the same root (Boot 2010:148; Dakin 1982:146, n. 188) or as building on a Mixe-Zoquean root involving **ko'-* for 'items pertaining to the head' (Kaufman and Justeson 2008:57). The Nahuatl root for 'head' *k^{w}aa-* is reconstructed as coming from a PCN root **kopa* (or **kɨpa* where *ɨ* becomes *o* before a labial consonant.) In the development from **kópa* to *k^{w}aa* the medial *p* is weakened to *h* in the unstressed syllable, yielding **koha*. In later developments the *h* fuses with the *a* to make a long vowel *aa*, and *o* becomes a labialization of the preceding *k*; developments that were already described by Edward Sapir (1915). So at some point in the development from PCN to proto-Nahua the word for 'head' must have been **koha*. The final *w* expressed as the syllabogram **wa** in the term used by the Maya for the helmet, corresponds perfectly with one of two PCN possessive suffixes. The suffix *-ya* or *-yi* describes inherent possession and is used with body-parts (this provides the Nahuatl word for 'head' as *k^{w}aa-yi-tl*), and the *-wa* suffix describes alienable possession and is used in possessive constructions. Consequently, the word **kóha-wa* in PCN would have had the meaning 'alienably possessed head', or 'removable head'—a good fit for the meaning of a large helmet.

Conclusions

In this article, we have proposed that some logograms of Teotihuacan writing can be read by using values from a reconstructed proto-language ancestral to Cora, Huichol and Nahuatl and identifying the use of rebus principle to prompt phonetic readings. We have proposed readings for a selection of logograms including **NAKA** ('ear/nopal'), **KO** ('basin/hole/locative suffix'), **NAWA** ('root/locative suffix'), **TE** (used in the words for 'stone', 'mountain' and 'cave', all of which begin with the syllable /*te*/ in PCN), and a logogram for **KOSA** ('yellow/nacreous/necklace'). We have also proposed that the two words *kosaka* and *ko'haw* recorded in Maya writing in Teotihuacan-related contexts can also be analyzed as lexical items of the PCN language. We do have other potential readings of logograms and refer the interested reader to our Supplemental Materials.

This is by no means a full decipherment of the writing of Teotihuacan, but provides a strong lead for continuing work using this method and drawing on this candidate language. Two techniques have proved useful: One is identifying logograms with their potential meanings in the writing, and looking for their possible readings in the reconstructed for PCN vocabulary. The other is to consider homophonous roots in the reconstructed lexicon and see if these words could be represented as logograms in the writing in ways that suggest that rebus is at play.

Though new in its substance, the argument is not without prior foundations. Its underlying thrust has been proposed by many others before: that the language of Teotihuacan was likely related to Nahuatl. The readings proposed herein are thereby not incompatible with other proposals made by King and Gómez Chávez (2004) or Whittaker (2021:174-193). However, we show that the language in which motivated readings can be proposed, is not Nahuatl as it is known from the colonial sources, but a language that is substantially older, by approximately a millennium. Logograms, such as those for 'ear/nopal' or that for 'cave', cannot be read using values from colonial Nahuatl, or even proto-Nahuatl as reconstructed by

Dakin (1982)—but only in an even older variety, from a time when it was much more similar to the other Southern Uto-Aztecan languages, Cora, Huichol, Yaqui-Mayo, Tubar, Tepehuán and Ópata.

We believe that several elements of our proposal make it stronger than previous similar proposals. First, all of our phonetic readings are motivated by corroborating elements outside of the semantic content of the logogram itself, either through a) the identification of the rebus principle in which a logogram stands for something other than what it depicts (**NAKA**, **KOSA**, **NAWA**, **KO**), b) by the use of phonetic complementation that only works in the candidate language (**TE**-series), c) by reading the words written in another script with known phonetic values (**KOSA**), and/or d) through corroborations of the expected parts of speech. Second, the candidate language has the appropriate time-depth and has been systematically reconstructed, independently of the process of decipherment, so that candidate words are not reconstructed on an ad hoc basis to fit the proposed readings. Third, among our readings are not only nominal roots, but also other parts of speech, such as verbs and examples of postpositional suffixes that are combined in a way that is grammatically correct in the candidate language.

We also show significant continuities from Teotihuacan writing to later Epiclassic and eventually Aztec writing, both in terms of the principles and mechanisms (focus on logograms, use of rebus and double spelling) of writing, but also even in the phonetic readings of some logograms (the 'stone' logogram with the value **TE**, the ceramic jar spelling **KO**, and even the mountain sign read as **TEPE**). Interestingly, the logogram for the color 'yellow' and for 'necklace', is identical to other Mesoamerican logograms with the same meaning—but using a different phonetic value, in each language. This confirms that certain signs were shared between different Mesoamerican writing systems, already in the first centuries of the first millennium, undoubtedly as shared retentions from ancestral writing systems (Helmke and Davletshin 2019; Houston 2004). This continuity of language and writing, also suggests a significant ethnolinguistic continuity between the Teotihuacanos of the Classic, and the subsequent Nahua peoples who inhabited the surrounding valleys in the Postclassic.

We should also remember, that the proposal that speakers of Uto-Aztecan were present at Teotihuacan from its earliest phases, does not mean that there were not also speakers of other languages, including perhaps Totonac, Otomi-Mazahua, and of course Zapotec and Maya. As such, continued work will also have to address these other language groups, and their interactions at Teotihuacan. Despite this diversity, it appears that the Southern Uto-Aztecan peoples had a significant role in establishing and developing the great Mesoamerican city, and that it was here, through the interaction with other Mesoamerican peoples, that the Nahuatl language took on its familiar shape, and completed its adaptation to the Mesoamerican linguistic area.

Figure 1. a) The metropolis of Teotihuacan as an archaeological site today. b) Maps showing the location of Teotihuacan (inset) and the distribution of Teotihuacan hieroglyphic writing at sites in the Central Mexican highlands (all photographs and drawings by Christophe Helmke, unless otherwise specified).

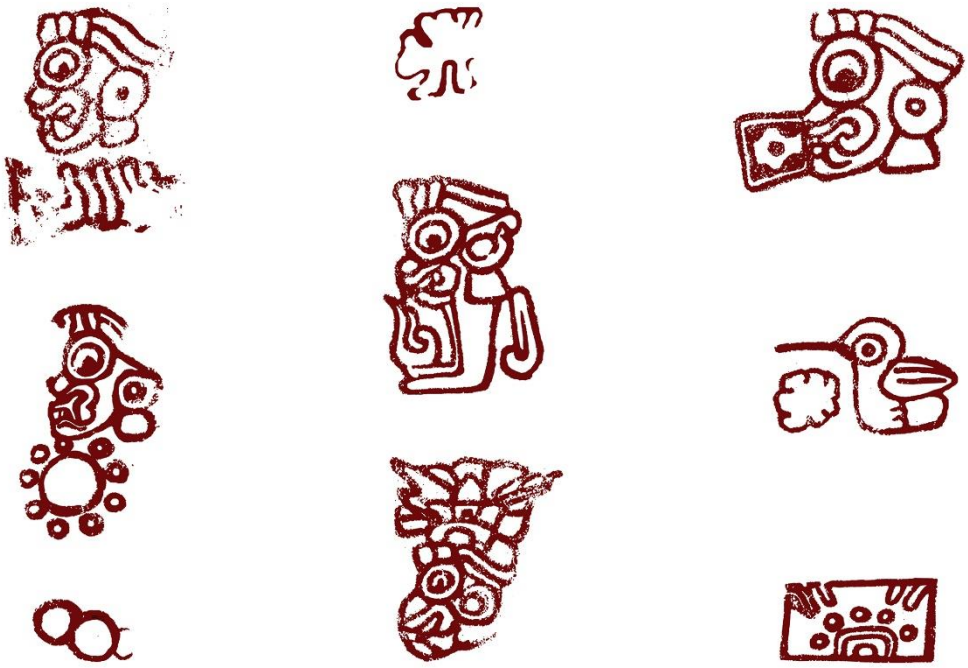

Figure 2. Example of a linear text in Teotihuacan writing painted in three columns on the floor of the Plaza de los glifos in the La Ventilla sector.

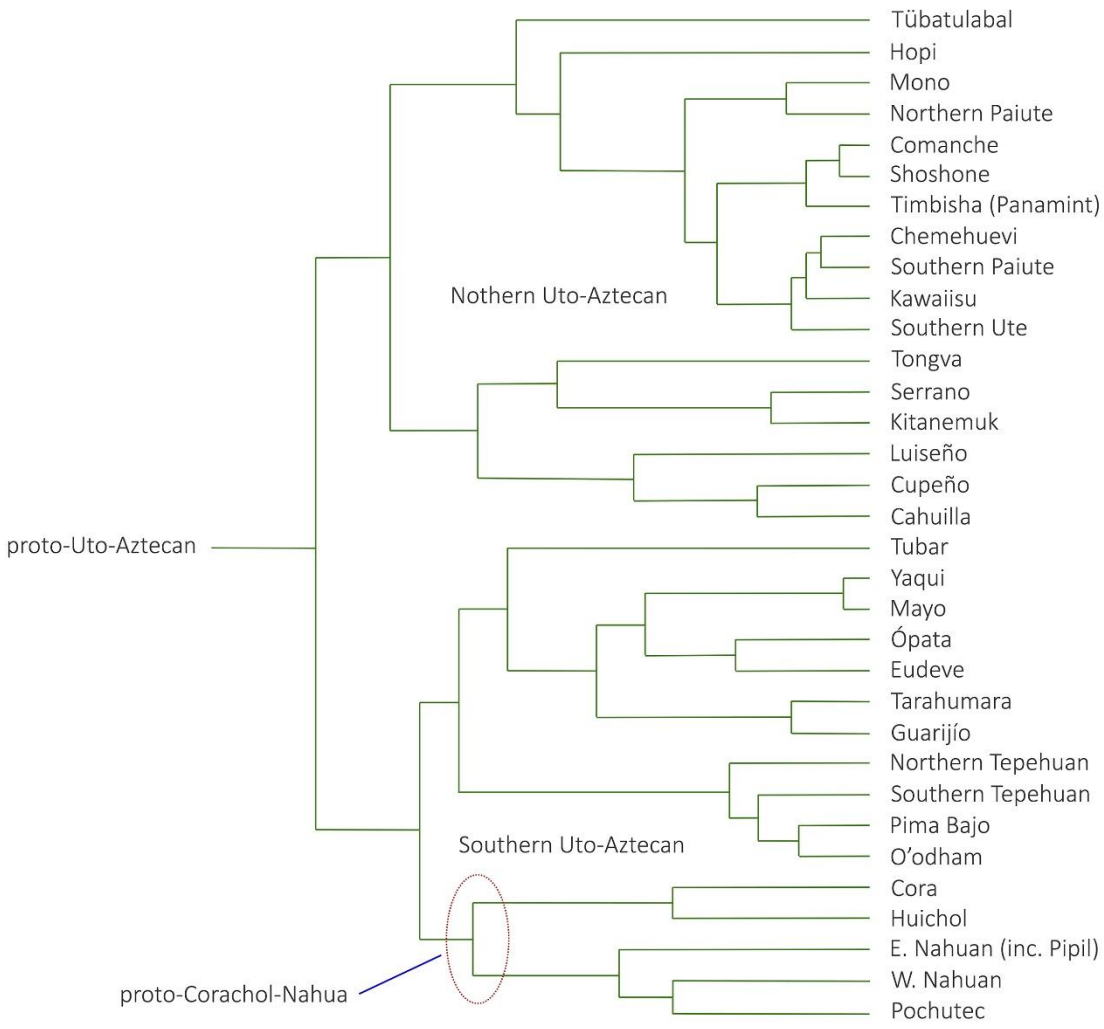

Figure 3. Genealogical tree of Uto-Aztecan languages based on lexicostatistical analyses (adapted after Greenhill et al. 2022: Fig. 2).

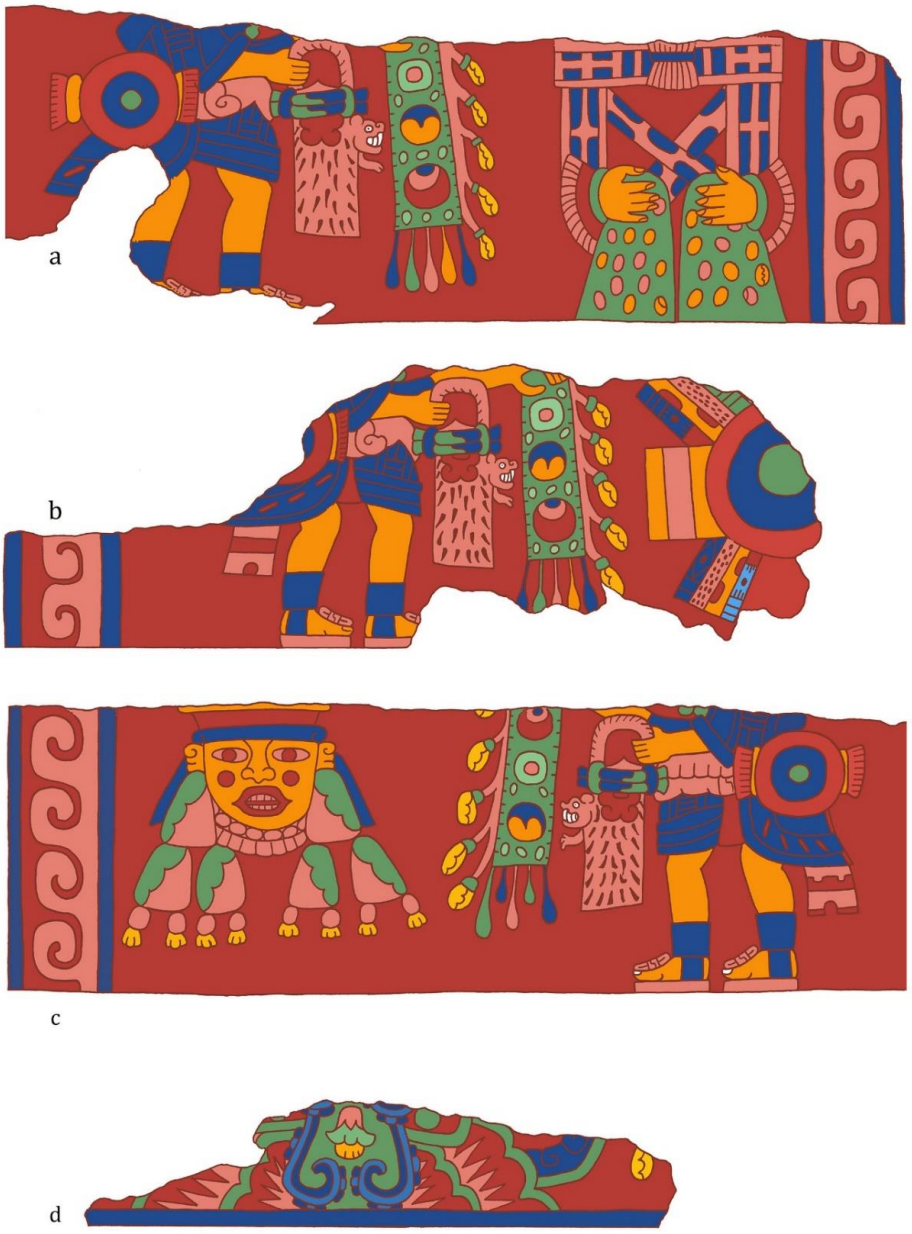

Figure 4. The murals of Patio 1 at Tetitla, showing a procession of priestly figures conducting scattering rituals, each accompanied by a large glyphic compound. a) An ‘enclosure’ sign and disembodied hands scattering, forming the verb. b) The so-called ‘four element group’ crossing behind a possible shield, as an anthroponym. c) The human face with ears of nopal (*Opuntia* sp.), as a likely anthroponym. d) A mountain emitting a florid song, as a toponym (drawings by Christophe Helmke, based on original reproductions by Felipe Dávalos in Miller 1973: Figs. 231-241).

Figure 5. Examples of double-spelling involving two homophonous logograms in Aztec writing. a) **K^{W}AW-K^{W}AW** for <*Quaguacan*> and b) **[KOYO]KOYO** for <*Coyuacan*> (Codex Mendoza, fol. 5v).

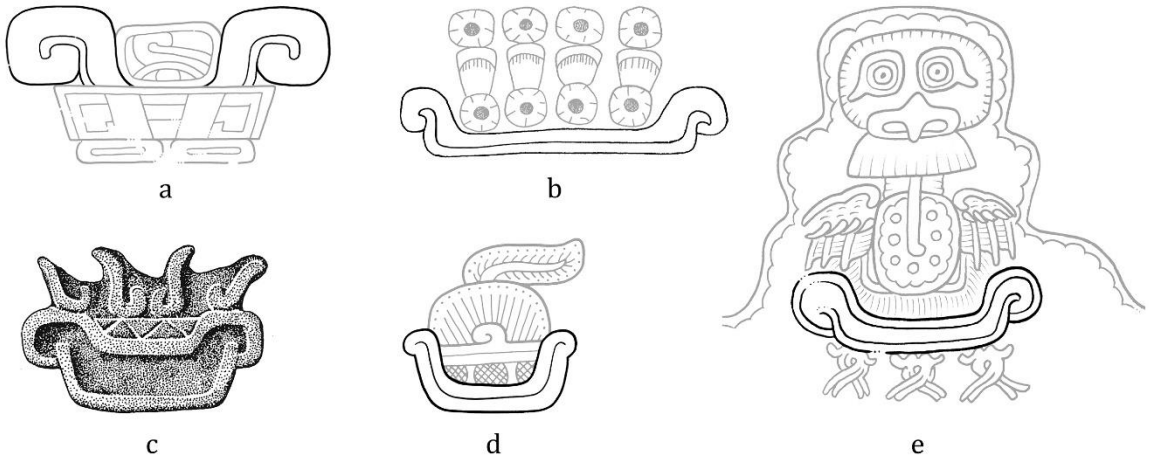

Figure 6. Examples of the ‘shallow basin’ sign in Teotihuacan writing (emphasized). Uses with calendrical notations: a) the date ‘7 Reed’ written with a ‘Reptile Eye’ glyph (detail of the Ixtapaluca plaque). Uses in toponyms: b) four atlatl dart butts as qualifying elements (after von Winning 1987: II: Chapt. 8, Fig. 3d), c) flames (after von Winning 1987: II: Chapt. 2, Fig. 22k), d) a ‘Reptile Eye’ glyph for ‘reed’ (detail of the stucco facade of Acanceh), and e) the name of a mountain combining the ‘shallow basin’ and ‘twisted root’ signs (Atetelco murals).

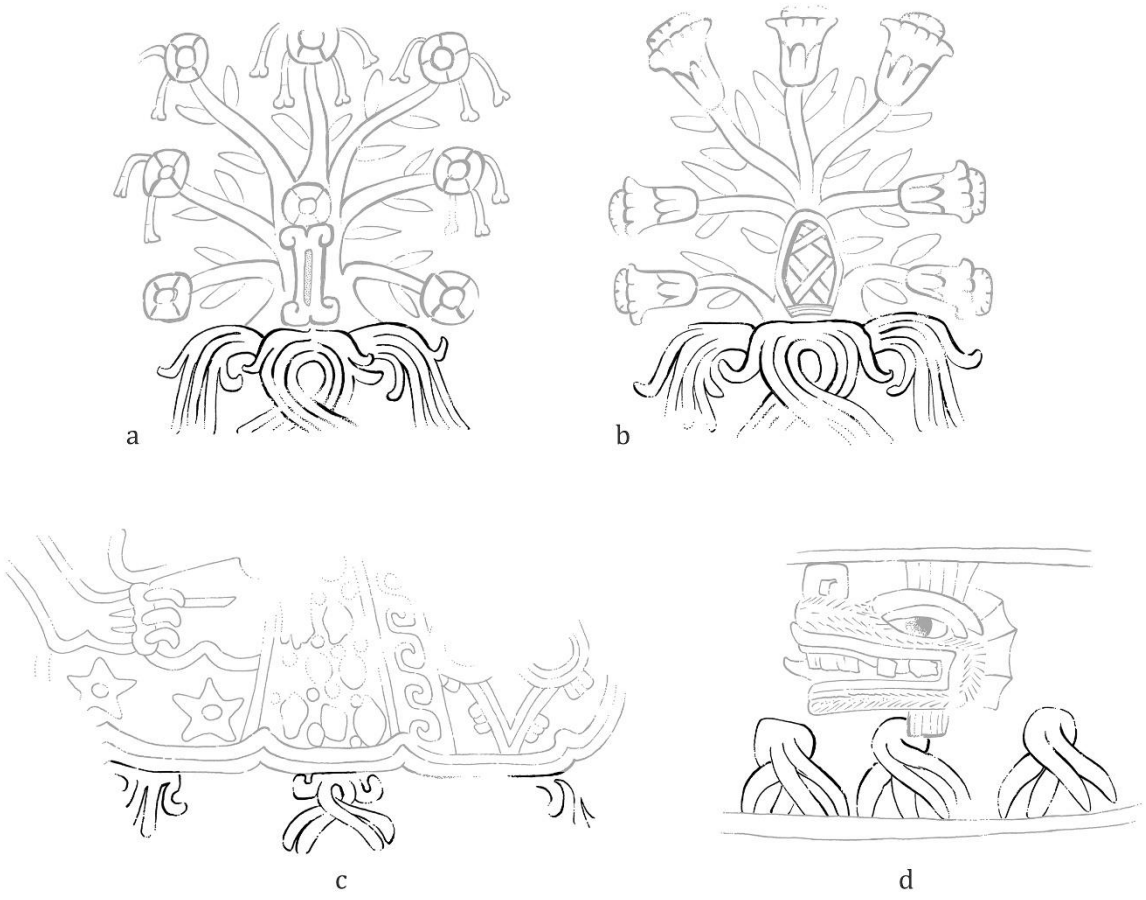

Figure 7. Examples of the 'twisted root' sign in Teotihuacan writing (emphasized). a) The 'red bone flower' tree and b) 'red basket flower' tree (Techinantitla murals). c) Basal register of a mythological scene (Zona 5A, Portico 3, Mural 2). d) Detail of a stucco-painted cylindrical tripod vase (drawing by Christophe Helmke, based a photograph in Berrin 1988: Fig. VI.28).

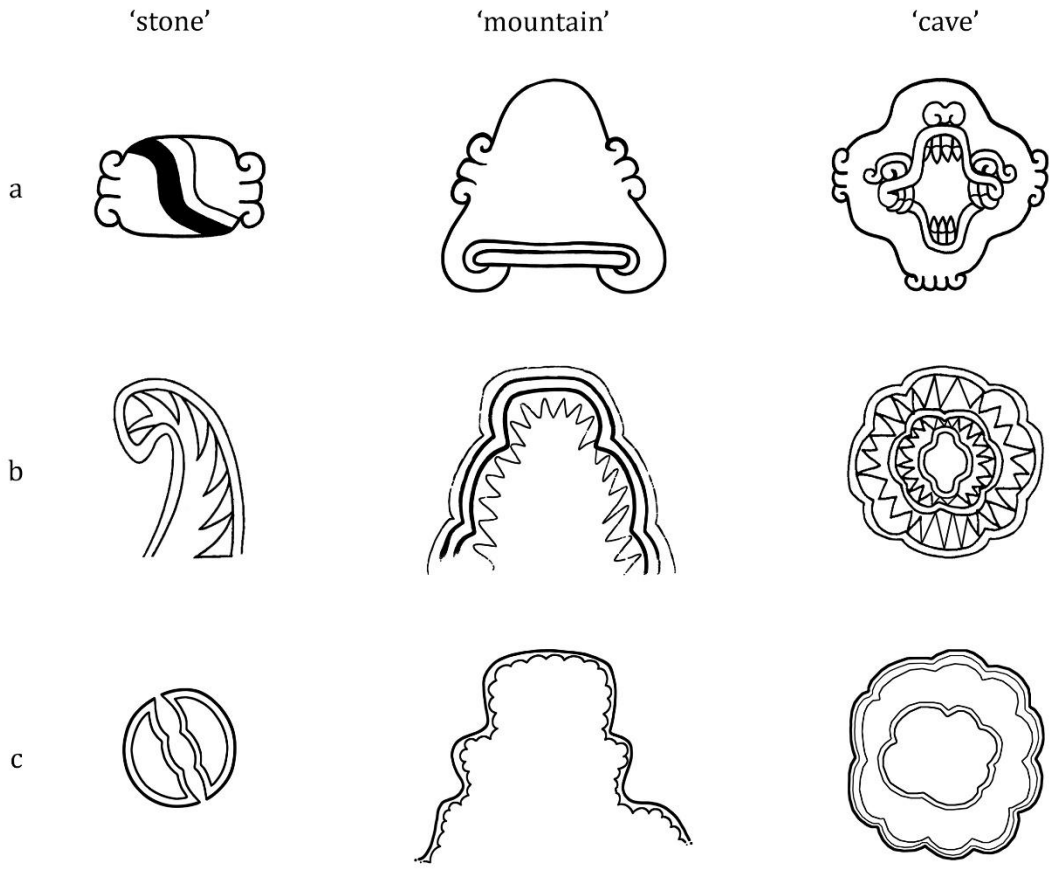

Figure 8. Diagnostic elements shared between the logograms for 'stone', 'mountain' and 'cave' in two different Mesoamerican writing systems. a) Note the lateral scrolls in the Aztec logograms for *te[tl]*, *tepee[tl]*, and *ostoo[tl]*. Note the: b) triangular serrations and c) lunate crenellations in the Teotihuacan logograms for **TE**, **TEPE** and **TESO** (after Helmke and Nielsen 2014: Fig. 5).

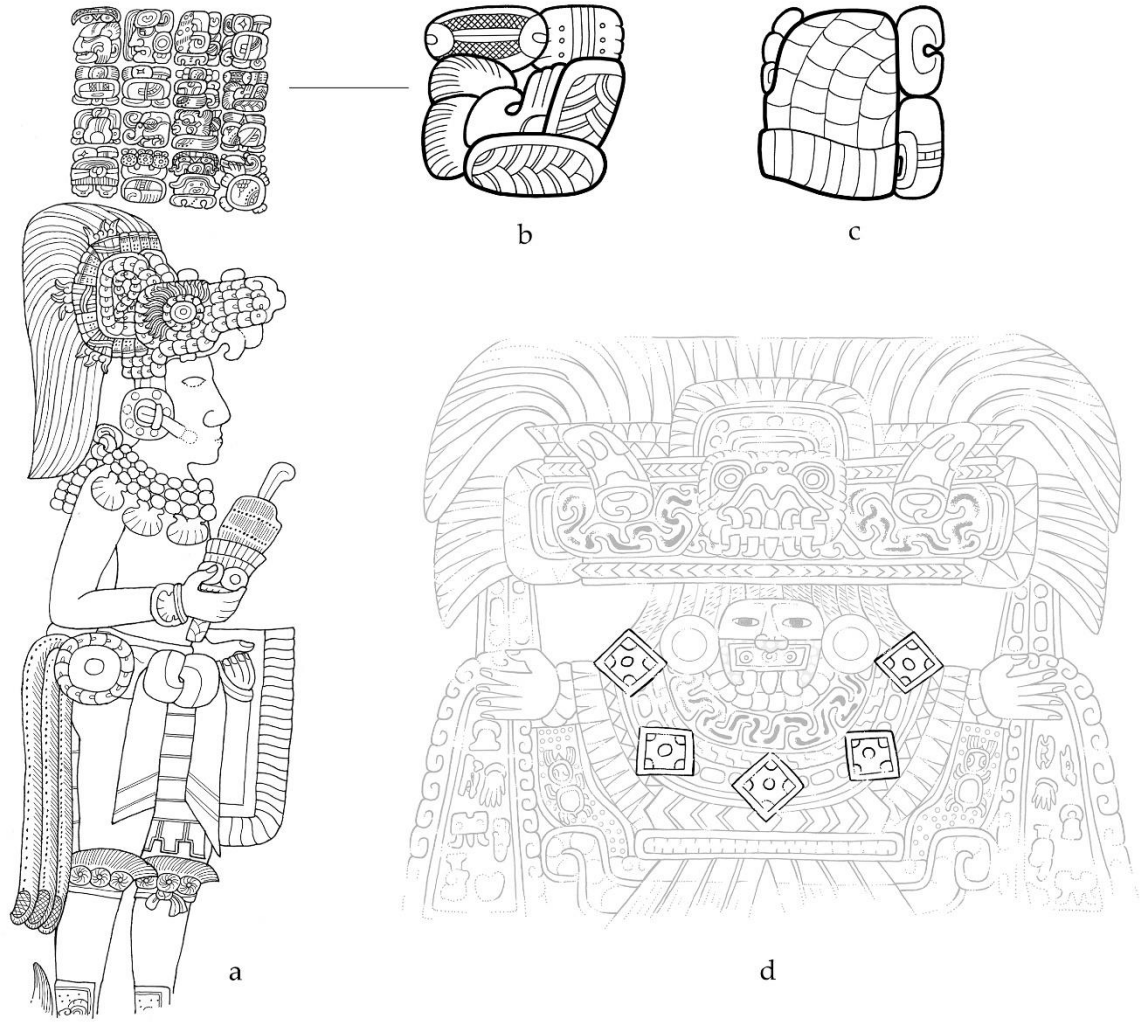

Figure 9. Correspondences to Classic Maya hieroglyphic writing. a) The left side of Stela 31, at Tikal (Guatemala), showing a foreign emissary in Teotihuacan attire (drawing by Linda Schele © David Schele, courtesy of the Los Angeles County Museum of Art). b) The glyphic sequence **ko-sa-ka** in the glyphic text on the side of Stela 31. c) The Teotihuacan-style helmet known as a *ko'haw*, as recorded in the texts of Palenque (Mexico). d) Detail of a Teotihuacan mural showing a glyphic compound dominated by a funerary bundle, dressed in opulent attire, including a necklace decorated with quincross glyphs, for which we propose the logographic value **KOSA**.

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Cover Letter

UNIVERSITY OF COPENHAGEN
DEPARTMENT OF CROSS-CULTURAL AND REGIONAL STUDIES

Laurence Ralph and the editorial board of Current Anthropology

Dear Editors

10 DECEMBER 2022

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We are happy to submit for consideration for publication in Current Anthropology our article "The Language of Teotihuacan Writing". The article presents arguments in favour of identifying the language of ancient Teotihuacan Writing as a Uto-Aztecan language directly ancestral to the contemporary Nahuatl, Cora and Huichol languages. The identification of the language is possible, because several glyphs in the Teotihuacan writing system can be read as logograms used for phonetic readings when using reconstructed vocabulary for this ancient language. If accepted by our peers, this constitutes a major step forward in our understanding of the Teotihuacan script, as well as for our understanding of Mesoamerican history in general.

Because the article has a potential impact on various fields of anthropology, including linguistics, archaeology and the study of indigenous cultures of Mesoamerica, and because the proposal is also likely to be met with a good deal of justified critical scrutiny by our peers (as all decipherment proposals should), we consider Current Anthropology to be the ideal journal of publication. As similar papers on Mesoamerican and other writing systems have been published in CA in the past (including Kelly et al. 2021; Hyland 2017; Houston, Robertson & Stuart 2000, 2001; Houston & Stuart 1992), we feel confident that readers with interests in the decipherment of historical writing systems are well-represented among the journal's readership.

We have proposed five reviewers that we consider among the most likely to have the appropriate expertise to evaluate the epigraphical and linguistic aspects of the manuscript. They are, Marc Zender (Tulane), Karen Dakin (UNAM), Gordon Whittaker (Georg-August Universität Göttingen), Albert Davletshin (Universidad Veracruzana), Erik Velásquez (UNAM). Other suitable reviewers who might also provide comments could be Stephen Houston (Brown), David Stuart (UT Austin), Lyle Campbell (Hawai'i

Manoa), Jesper Nielsen (University of Copenhagen), Janet Berlo (Rochester), and Segio Gómez Chavez (INAH, Mexico).

The article is accompanied by a substantial supplementary material that details the methods and data on which the reconstruction of the proto-Corachol-Nahua vocabulary used in the decipherments are based, as well as a catalogue of potential readings of other Teotihuacan signs. Though this material is not directly necessary for understanding or evaluating the argument in the article, it should ideally be available for reviewers as well as any other eventual readers interested in evaluating the methods and data.

We trust that you will find the manuscript sufficiently interesting to send it out for review, and look forward to reading the comments.

Yours sincerely,

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